

IN THE CLAIMS

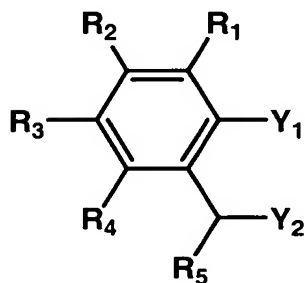
This is a complete and current listing of the claims, marked with status identifiers in parentheses. The following listing of claims will replace all prior versions and listings of claims in the application.

1. (Previously Presented) A multinuclear rare earth complex formed by coordinating one or more types of molecules having a photosensitizing function and a vibrational energy quenching-suppressing function to a plurality of rare earth ions, which is represented by the general formula: $L_p L'_q (Ln)_r X_s$,

wherein

L is a ligand having a photosensitizing function represented by the general formula:

[Chemical Formula 1]



wherein R_1 , R_2 , R_3 , R_4 and R_5 are independently hydrogen, a hydroxide group, a substituted or unsubstituted amino group, a substituted or unsubstituted aryl group, a nitro group, a cyano group, an alkyl group or a cycloalkyl group represented by $-R$, an alkoxy group represented by $-OR$, or an acyl group represented by $-C(C=O)R$, where R is a substituted or unsubstituted alkyl group or cycloalkyl group having a carbon number of 1 to 20;

Y_1 is $-OH$; and

Y_2 is $=O$;

p is an integer of 1 to 40;

L' is a ligand which is a hydroxide ion;

q is an integer of 0 to 8;

Ln is a rare earth ion;

r is an integer of 2 to 20, where a plurality of Ln may be different from each other;

X is O, -OH, S, -SH, Se or Te;

s is an integer of 1 to 20, where a plurality of X may be different from each other when s is an integer of 2 to 20; and further, the integers p, r and s have a relationship indicated by the expression:

[Expression 1]

$$1 \leq p/r \leq 4, 1 \leq r/s \leq 4$$

wherein a coordination manner of L to Ln is: Coordination Manner (A) where both Y₁ and Y₂ bind to the identical Ln; Coordination Manner (B) where Y₁ and Y₂ bind to different Ln each other; and a combination thereof, wherein when Y₁ coordinates to Ln, a proton leaves from -OH represented by Y₁ to form -O-, thereby L coordinates to Ln via -O-.

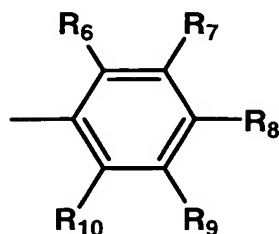
2. (Cancelled)

3. (Cancelled)

4. (Previously Presented) The multinuclear rare earth complex according to claim 1, wherein at least one of substituents R₁, R₂, R₃, R₄ and R₅ are an alkyl group or a cycloalkyl group represented by -R, an alkoxy group represented by -OR or an acyl group represented by -C(=O)R, where R is substituted or unsubstituted alkyl group or cycloalkyl group having a carbon number of 1 to 20.

5. (Previously Presented) The multinuclear rare earth complex according to claim 4, wherein R_5 is represented by the formula:

[Chemical Formula 2]



wherein R_6 , R_7 , R_8 , R_9 and R_{10} are independently hydrogen, a hydroxide group, a substituted or unsubstituted amino group, a substituted or unsubstituted aryl group, a nitro group, a cyano group, an alkyl group or a cycloalkyl group represented by $-R$, an alkoxy group represented by $-OR$, or an acyl group represented by $-C(C=O)R$, where R is a substituted or unsubstituted alkyl group or cycloalkyl group having a carbon number of 1 to 20, where at least one of R_1 , R_2 , R_3 , R_4 , R_6 , R_7 , R_8 , R_9 and R_{10} are an alkyl group or a cycloalkyl group represented by $-R$, an alkoxy group represented by $-OR$, or an acyl group represented by $-C(C=O)R$, where R is a substituted or unsubstituted alkyl group or cycloalkyl group having a carbon number of 1 to 20.

6. (Previously Presented) The multinuclear rare earth complex according to claim 4, wherein R_5 is an alkyl group or a cycloalkyl group represented by $-R$, an alkoxy group represented by $-OR$, or an acyl group represented by $-C(C=O)R$, where R is a substituted or unsubstituted alkyl group or cycloalkyl group having a carbon number of 1 to 20.

7. (Currently Amended) The multinuclear rare earth complex according to claim 5—~~or~~—6, wherein R is a substituted or unsubstituted alkyl group having a carbon number of 6 to 12.

8. (Previously Presented) The multinuclear rare earth complex according to claim 7, wherein R is a substituted or unsubstituted alkyl group having a carbon number of 8 to 12.

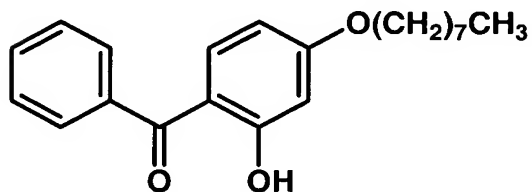
9. (Previously Presented) The multinuclear rare earth complex according to claim 1, wherein the rare earth ion is an ion of lanthanide selected from a group consisting of europium (Eu), terbium (Tb), neodymium (Nd), samarium (Sm), erbium (Er) and ytterbium (Yb) or a combination thereof.

10. (Previously Presented) The multinuclear rare earth complex according to claim 5, which is represented by the general formula: $L_{10}(Ln)_4X$,

wherein

L is a ligand represented by the formula:

[Chemical Formula 3]



Ln is europium (Eu) ion; and

X is o, and which has the following properties:

Elementary Analysis: as $C_{210}H_{250}O_{31}Eu_4$,

Theoretical values C, 65.04% H, 6.50% Eu, 15.67%

Observed values C, 64.90% H, 6.39% Eu, 15.41%

IR (KBr, cm^{-1}): (ν_{CH})2922, ($\nu_{C=C}$)1596, (ν_{Ph-O})1243

1H -NMR($CDCl_3$): δ 12.7(1H,s), δ 7.6-7.2(3H,m), δ 6.5-6.4(5H,d),
 δ 4.0(2H,t), δ 1.8(2H,m), δ 0.9(3H,t)

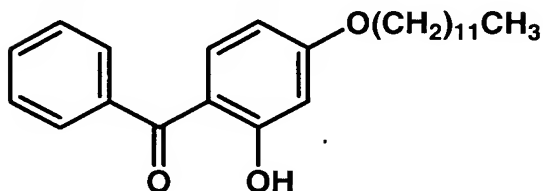
FAB-MS:m/z 3552.1 [$Eu_4(L^-)_9O^{2-}$] $^+$.

11. (Previously Presented) The multinuclear rare earth complex according to claim 5, which is represented by the general formula: $L_{10}(Ln)_4X$,

wherein

L is a ligand represented by the formula:

[Chemical Formula 4]



Ln is europium (Eu) ion; and

X is O, and which has the following properties:

Elementary Analysis: as C₂₅₀H₃₃₀O₃₁Eu₄,

Theoretical values C, 67.64% H, 7.49% Eu, 13.69%

Observed values C, 67.50% H, 7.45% Eu, 13.49%

IR (KBr, cm⁻¹): (ν_{CH}) 2924, (ν_{C=C}) 1608, (ν_{Ph-O}) 1247

¹H-NMR (CDCl₃): δ 12.7 (1H, s), δ 7.6-7.3 (3H, m), δ 6.5-6.4 (5H, d), δ 4.0 (2H, t), δ 1.8 (2H, m), δ 0.9 (3H, t)

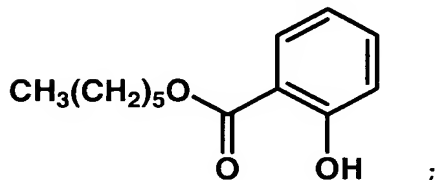
FAB-MS: m/z 4055.9 [Eu₄(L⁻)₉O²⁻]⁺.

12. (Previously Presented) The multinuclear rare earth complex according to claim 6, which is represented by the general formula: L₁₆ L'₈ (Ln)₉X₂,

wherein

L is a ligand represented by the formula:

[Chemical Formula 5]



L' is OH⁻;

Ln is terbium (Tb) ion; and

X is O, and which has the following properties:

Elementary Analysis: as $C_{214}H_{324}O_{72}NTb_9$,

Theoretical values C, 46.79% H, 5.93% Tb, 26.46%

Observed values C, 46.72% H, 5.18% Tb, 26.04%

IR (KBr, cm^{-1}): (ν_{CH}) 2957, 2931, ($\nu_{C=O}$) 1674, 1637, ($\nu_{C=C}$) 1598,
(ν_{Ph-O}) 1243

1H -NMR ($CDCl_3$): δ 10.9 (1H), δ 7.9-6.9 (4H), δ 4.3 (2H), δ 1.8 (2H),
 δ 1.4 (6H), δ 0.9 (3H)

FAB-MS: m/z 5140.2 $[Tb_9(L^-)_{16}(O^{2-})_2(OH^-)_8 + 2H^+]^+$.

13. (Currently Amended) A fluorescent substance containing the multinuclear rare earth complex according to ~~any one of claims~~claim 1, and 4 to 12.

14. (Previously Presented) A resin formed materials made by compounding the fluorescent substance according to claim 13.

15. (New) The multinuclear rare earth complex according to claim 6, wherein R is a substituted or unsubstituted alkyl group having a carbon number of 6 to 12.

16. (New) A fluorescent substance containing the multinuclear rare earth complex according to claim 4.

17. (New) A fluorescent substance containing the multinuclear rare earth complex according to claim 5.

19. (New) A fluorescent substance containing the multinuclear rare earth complex according to claim 9.